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## **Fallacious Reasoning and Complexity as Root Causes of Clinical Inertia**

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Introduction:

The behavior of physicians who fail to implement evidence based treatments has been coined clinical inertia. The root cause of planning error is fallacious reasoning, a predictable result of human behavior. This vulnerability is compounded by the prevailing misconception that diligence will result in perfection. The truth, or course, is that their reasoning is only human and to err is human.

When addressing clinical inertia, Medicine has not remembered that restatement of compelling evidence has never been a sufficient force to change established clinician behavior. Such a change is not so much the integration of new information, but a change in attitude. Many solutions and beliefs are well established old friends that have given the clinician comfort in the past. They often reflect values adopted from mentors long before newer medical evidence was available.

### Risk Factors for Under-treatment of Chronic Disease

#### Patient Factors and Underservice

- Presence of multiple comorbidities
- Low socioeconomic status
- Advancing age
- Feminine gender
- Low medical literacy
- Lack of access to health care

#### • Patient non-adherence, non-compliance Physician Factors and

#### Underservice

- Clinical inertia
- Fallacious reasoning
- Ageism
- The dual task theory
- Tendencies to underestimate benefits of treatment
- Tendencies to overestimate adverse effects of treatment System Factors and Underservice
- System of compensation
- Defensive medical record keeping
- Lack of training to manage multiple comorbidities

Flawed thinking and the inappropriate use of simple solutions were utilized by discharging hospital physicians in a manner similar to the author. These solutions often resulted in inappropriate withholding of evidence based treatments. Developing perspective into this unexpected observation required development of jargon.

In the two cases presented above, the author was fooled by fallacy and complexity to arrive at a very comforting solution. In doing this, the author stumbled three times over the conjunction fallacy, once over the metaphor/context complexity, once over the consumer/beneficiary complexity, and almost certainly over the omission/commission bias.

### **The Conjunction Fallacy**

Bar-Hillel's admonition seemed to describe the author's mindset at the time treatment decisions were made for the two patients. The careful decision maker should keep this in mind when making intuitive judgments. The first incorrect assumption was that both of these residents would have died sooner. The reality is that the sickest 1% of our society survives much longer. The second incorrect assumption was the author's belief that because these residents were inactive, they were unlikely to fracture. The third incorrect assumption was that these inactive patients near the end of their lives would not need hop repair even if they did fracture.

### **The Omission/Commission Bias**

The omission/commission bias is truly a misnomer because the bias applies equally to omitting and to committing to treatment interventions. It more correctly speaks of the human tendency to select the safest option over a superior option which carries some risk. The bias factors heavily in most decisions to withhold evidence-based treatments for chronic conditions. Patients and families seldom notice under-treatment of chronic conditions, and are far more likely to complain about polypharmacy. Colleagues frown at polypharmacy even when treatments are clearly indicated. Nursing home quality indicators infer that polypharmacy is bad. By contrast, physicians are seldom held responsible when complications occur in patients not treated for a chronic condition. In this way, the bias against polypharmacy favored the decision to withhold evidence based on RxOP from the two patients.

### **Fallacy or Complexity with Aphorism**

**The Gambler's Fallacy:** The human tendency to define outcomes in terms of good or bad luck, ignoring recency.

**Occam's Razor:** The human tendency to accept an obvious solution

**The Costvalue Illusion:** The human tendency to equate value with cost

**The Conjunction Fallacy:** The human tendency to assume sensible outcomes of compound gambles incorrectly, without measuring the reality of such compound gambles

**The Omission/Commission Bias:** The human tendency to select safe management options over superior but more risky options.

**The Consumer/Beneficiary Complexity:** The inability of all humans to simultaneously consider the multiple factors involved in cost-benefit analysis

**The Metaphor/Context Complexity:** The application of a good solution or schematic in an inappropriate context

### **The Consumer/Beneficiary Complexity**

The consumer/beneficiary complexity is, in fact, almost too complex to consider in a short paragraph. But practitioners must deal with this complexity each time they individualize chronic care for one of their complex patients. Acquisition costs and costs related to

complications and monitoring for safety must then be measured against the value of the expected benefits of treatment. The analysis is difficult because of the known limitations of the human brain regarding the number of variables it can consider simultaneously, and without tools and training would be beyond the capability of the practitioner. Evidence Based Medicine has been a concerted effort to assist the practitioner in navigating these choppy waters. Practitioners find it difficult or impossible to know when additional information is worth its cost. It is involved a miscalculation of the costs of treatment against the various outcomes, the costs of which would be borne by society.

### **The Metaphor/Context Complexity**

One such simple solution is that of compassionate neglect of potentially treatable comorbidities. Compassionate behavior from mentors, without ever seriously considering that his solution might be utilized inappropriately.

### **The Gambler's Fallacy and Positive Recency**

The gambler's fallacy would have us think that patients with many bad clinical outcomes would surely get lucky.

### **Occam's Razor**

Occam's razor encourages that we adopt the simplest conclusion rather than considering complex alternatives. It is one of the operative cognitive complex pitfalls encouraging the availability heuristic to contribute to medical error. This is frequently the cognitive basis for attributing bad outcomes to human error while overlooking the contribution of system error.

### **The Cost/Value Illusion**

The cost/value illusion is frequently encountered when physicians equate value with the cost of medical care, testing or treatments. Without systems, even the best institutions score poorly on compliance measurements. The cost/value illusion is also encountered when additional testing or consultation of marginal benefit is ordered. The assumption that more testing or consultation will lead to improved outcomes is being challenged, as additional testing or consultation of marginal benefit may have unintended adverse effects on quality of patient care.

### **Discussion**

An important distinction is that planning may be different cognitive process than diagnostic reasoning. During the past several decades, planning in medicine has become exceedingly complex in a very short interval, out-stripping the ability for evolution to have prepared our brains for the task at hand.

The human brain remains a remarkable computer and, given adequate time, it can solve all manner problems, one at a time. Humans, quite simply, are born statistically blind and with a vulnerability to information overload. In addition, practitioners are vulnerable to human pitfalls in reasoning and this vulnerability issues that they will have an inherent error rate in diagnostic reasoning and planning. Planning error is so seldom recognized by many practitioners that they can become convinced that they do not err. There is also similarity between Occam's razor and the framing and availability heuristics. There is even more overlap of the fallacies presented in this limited classification. For instance, the cost/value illusion could be seen as a highly specific and over-learned application of the conjunction fallacy. This overlap is unavoidable and beyond the scope of this article.

This study is a dynamic process, and, unexpectedly, the author has discovered two additional planning error types that had been previously subliminal in the author at the time of the

preparation of the text. These are Type I errors and Type II errors. Type I error are failure to detect a signal, and Type II errors are incorrectly interpreting noise as a signal.

### **Conclusions**

It argues Goldratt's point that jargon is necessary so that we might recognize, discuss, and understand deficiencies in our formal education. It also proposed that the phenomenon of planning error may be one of the soft root causes of clinical inertia. It is troubling that insight into fallacious reasoning is not readily available to front-line practitioners. We should make every effort to minimize the influence of cognitive bias in the decision making process. The practitioner should consider the limitations of his capabilities to think statistically. Decision making for that type of individualization should be well conceived and not based on simple solutions.

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